REMARKS

Claims 1 and 3-21 are pending. Claims 1, 7, 11, 13-15, and 18-19 have been amended to improve their form, and claim 2 has been previously cancelled. Further, claims 20 and 21 are newly added. No new matter has been introduced by the amendment.

The Specification has been amended to place the Specification in better form. A Substitute Specification has been provided herewith for the convenience of the Examiner. In addition to specification amendments submitted herewith, the Substitute Specification also reflects the amendments presented in the applicants' Preliminary Amendment filed with their application on June 14, 2005. The applicants note that only a portion of the specification amendments submitted with their Preliminary Amendment appear in Published U.S. Patent Application No. 2006/0202126. No new matter has been added by the amendment.

Rejection Under 35 U.S.C. 103(a)

Claims 1, 4-12, and 14-19 have been rejected over Kamimura et al. in view of Kannan et al. This rejection is overcome in view of the following remarks.

Claim 1 recites a device for processing a detector current supplied by a particle detector that includes a unit for reducing a fluctuating component of background noise present in the detector current, and providing a treated detector current. The unit comprises a converter for associating the treated detector current with a treated voltage signal, a threshold trigger, and a converter for associating the treated detector current with a treated voltage signal

The threshold trigger provides a treated voltage signal by passing an intermediate voltage signal when the intermediate voltage signal exceeds a first predetermined threshold, and preventing the intermediate voltage signal from passing when the intermediate voltage signal falls below a second predetermined threshold. The device further includes an integrator for measuring a total charge transported by the treated detector current for a predetermined time

interval. The applicants assert that the device of claim 1 is not suggested or disclosed by Kamimura et al. or Kannan et al.

Kamimura et al. disclose an X-ray sensor signal processor that includes a semiconductor sensor (21) linked to an integrator (components 115, 116, and 117) through a capacitor (114). The device processes signals from X-ray pulses for creating images by computer tomography. A dark current generated in the X-ray sensor is removed by means of capacitor that removes the DC component from the output signal of the X-ray sensor. A value proportional to the average number of photons in the X-rays is obtained by integration of the output signal of the X-ray sensor. (See Paras. 0010-0012). As acknowledged in the instant Office Action, Kamimura et al. fail to suggest or disclose converting the current into a voltage and using a threshold trigger to filter out background noise. (Office Action, pg. 3).

The Office Action asserts that Kannan et al. disclose a threshold trigger that allows a voltage signal to pass when it exceeds a first threshold, and prevents the voltage signal from passing when it falls below a second threshold. (Office Action, pg. 3). The Office Action further asserts that one skilled in the art would somehow apply the voltage processing components of Kannan et al. in the current processing device of Kamimura et al. by means of two current/voltage converters, even though current/voltage converters are not disclosed by either reference.

The applicants assert that one skilled in the art would not be motivated to pick and choose components from references disclosing technologically different devices, such as the pocket radiation dosimeter of Kannan et al. and the X-ray processor of Kaminmura et al., and which are unrelated to the applicants' device. Even if the various elements of these references were combined, they would not provide the applicants claimed signal processing device.

The applicants assert that rather than disclosing the applicants' claimed threshold trigger, Kannan et al. disclose a radiation detector that produces voltage pulses that are amplified by a pulse amplifier (6) and fed to a discriminator (9). The discriminator outputs pulses of height more than a certain

threshold voltage in order to cut off noise pulses. (See Para. 88). Rather than integrating the output signal from the a threshold trigger, as recited by claim 1, the device of Kannan et al. counts pulses using a programmable divider (10) and an electronic counter (11). The pulses from the discriminator are fed to the programmable divider, which consists of a CMOS 8 bit binary counter, a switch, diodes, and resistors. A counter is reset after any required number of pulses from 1 to 31, and the output of the divider circuit can be programmed to provide division from 1 to 31. (See Para. 95).

The applicants assert that the pulse counting components and process of Kannen et al. substantially differ from "an integrator for measuring a total charge transported said treated detector current for a predetermined time interval," as recited by claim 1. The Office Action inherently recognizes that the disclosure of Kannen et al. is limited to counting voltage pulses by concluding that an undisclosed converter is needed to render the signal "suitable for the integrator." (Office Action, pg. 3).

The applicants assert that the devices disclosed by Kamimura et al. and Kannen et al. substantially differ from the applicants' claimed device, and that claim 1 is patentable over these references.

Claims 4-12 are allowable at least in view of the remarks pertaining to claim 1, from which they depend. Further, the Office Action alleges that the dosimeter of Kannen et al. and the X-ray device of Kamimura et al. teach the use of the applicants' invention in radiology, imaging, and fluoroscopy, as recited by claims 8-10, respectively. The device of Kannen et al. measure radiation doses and is unrelated to imaging. The applicants assert that, rather than suggest their invention, the statement in the Office Action pertaining to claims 8-10 supports the applicants' assertion that the dosimeter of Kannen et al. teaches away from the applicants' claimed background noise reduction unit and integrator.

Claim 14 recites a device for processing a detector signal derived from a particle detector that includes a unit for reducing a fluctuating component of background noise present in the detector signal. The unit includes a threshold trigger for allowing current to pass when the output voltage associated with an

input current of the detector signal exceeds a first predetermined threshold. The threshold trigger also prevents current from passing when the output voltage falls below a second predetermined threshold. The unit further includes a converter for associating the input signal produced by the unit with an output current of the threshold trigger. The device also includes an integrator for measuring the total charge transported by the input signal from the unit for a predetermined time interval.

The applicants' foregoing remarks pertaining to claim 1 are incorporated herein. The applicants assert that claim 14 is allowable over the cited references.

Claim 15 recites a method for processing a detector current signal derived from a particle detector. The method includes sensing a detector current and associating an intermediate voltage with a current derived from the detector current. The method also includes applying the intermediate voltage to a switch that allows the intermediate voltage to pass when the intermediate voltage exceeds a first predetermined threshold value and prevents the intermediate voltage from passing when the intermediate voltage falls below a second predetermined threshold value. The switch provides an output switch voltage. The method further includes associating a processed current with the output switch voltage, and integrating the total charge transported by the processed current.

Applicants assert that the cited references fail to teach or suggest allowing an intermediate voltage to pass when the intermediate voltage exceeds a first predetermined threshold and prevent the intermediate voltage from passing when the intermediate voltage falls below a second predetermined voltage, as recited in claim 15.

Claims 16-19 are allowable at least in view of the remarks pertaining to claim 15 from which they depend.

Claim 3 has been rejected over Kamimura et al. in view of Kannan et al. and further in view of Takebe et al. Claim 3 depends from claim 1, accordingly, this rejection is overcome in view of the applicants' foregoing remarks pertaining

to claim1, and Kamimura et al. and Kannan et al. The applicants assert that the addition of Takebe et al. does not overcome the deficiencies of Kamimura et al. and Kannan et al. The applicants assert that the disclosure of a converter in combination with the devices of Kamimura et al. and Kannan et al. does not render the applicant's claimed device obvious. This is at least because even if the various elements of these references were combined, they would not provide the applicants claimed signal processing device that reduces a fluxuating component of background noise and outputs a treated detector current to an integrator.

Claim 13 has been rejected over Kamimura et al. in view of Kannan et al. and further in view of Kameshima. Claim 13 indirectly depends from claim1, accordingly, this rejection is overcome in view of the applicants' foregoing remarks pertaining to claim1, and Kamimura et al. and Kannan et al. The applicants assert that the addition of Kameshima does not overcome the deficiencies of Kamimura et al. and Kannan et al. This is at least because even if the various elements of these references were combined, they would not provide the applicants claimed signal processing device that reduces a fluxuating component of background noise and outputs a treated detector current to an integrator.

New Claims

Claims 20 and 21 are newly added to the application in order that the applicants may more fully claim the subject matter of their invention. Claim 20 recites that the device of claim 1 further comprising a logic unit to reinitialize the integration process at predetermined time intervals. Claim 21 recites that the total charge transported by the treated detector current represents the total energy of the radiation received by the detector. Support for the new claims can be found in the applicants' Substitute Specification, for example, FIG. 2, and Para. 0007. The applicants assert that claims 20 and 21 point to further distinguishing feature of the applicants' invention.

The claims at issue distinguish over the cited references and are in condition for allowance. Accordingly, such allowance is now earnestly requested.

Respectfully submitted,

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